

6. TOTAL QUALITY MANAGEMENT FOR EXCELLENCE IN AN ENGINEERING INSTITUTE

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Abstract

Referring to the dream that India should be a Super Power by 2020, it is stated that if Engineering Education is to make its own contribution to translate this dream into reality, it must go in for Quality & Excellence. It is further mentioned that even otherwise, there is a global demand for Quality: besides moral, professional & social compulsions. The magnitude of the efforts to be made is described by the large number of the Institutions in the Engineering Education System. The concept of quality and excellence is elaborated. This is followed by describing the current status of quality in the system.

Referring to the literature survey on quality enhancement, particularly in western countries, it is suggested that TQM is the most appropriate philosophy and methodology for enhancement of quality for Indian conditions. The philosophy of TQM has been elaborated and the method of implementations also has been presented. Thus, the author has tried to convey the message of TQM for meeting the challenge of Quality and Excellence which the Engineering Education System has been called upon, to face.

1. INTRODUCTION

Engineering Education is the only profession which creates wealth for any nation. Hence, Engineering education has to be taken care of by any nation which aspires to be a super power. Dr. A. P. J. Abdul Kalam, our former President, has presented the nation with a dream "India to be Super Power by 2020". If this dream is to be translated into reality, people from every walk of life, will have to strive for it. If so, we, those concerned with Engineering Education, must plan for and work for realizing this dream. To be a super power, demands Quality and Excellence. How we can bring in this Quality and Excellence in Engineering Education is the biggest challenge for us.

2. THE ENGINEERING EDUCATION SYSTEM

We have one of the largest Engineering

Education systems in the world, may be next only to China. The magnitude of the system can be presented in a tabular form given below:

Engineering Education System
(Approximate Figures)

	Engg Colleges	Polytechnics
1. No of Institutes :	1,800	1,500
2. No of Teachers :	1,80,000	1,05,000
3. Intake :	5,00,000	3,60,000
4. No of Students :	20,00,000	10,80,000

- When we think of Quality and Excellence, we have to keep in mind that this Quality and Excellence has to be brought in, in 1800 Engineering Colleges and 1500 Polytechnics;

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- If we think of imparting technical Teachers Training, we have to train 1,80,000. Engineering College Teachers and 1,05,000 Polytechnic Teachers who are teaching a total student population of 30, 80, 000 Students.
- This is just to give an idea of the magnitude of the task, when we want to bring about any change.

3 WHY QUALITY AND EXCELLENCE ?

Global demand for Quality.

- 3.1 We adopted the policy of Globalization, Privatization & Liberalization in 1991, thereby, opening our market to the global players. Within the country, we ended the license raj and allowed private sector in all fields of activities. This resulted in a fierce competition on - Local, Regional, National and Global planes and there was a general demand for quality of goods and services. Education was no exception to this.

On the International plane, we sought the membership of the WTO i.e. The World Trade Organization, according to which Education is a tradable commodity i.e. Education can be purchased and sold. This resulted again in further demand for Quality Education.

- 3.2 We also sought the Membership of Washington Accord, where the Educational degrees of the Member countries are recognized and given the equivalence, Here again, Quality of Education is required, without which the Washington Accord cannot grant membership to any country.
- 3.3 Foreign Universities are entering our country and establishing their Campuses in a big way, and we are called upon to face stiff competition from these universities. Thus, Engineering Education in India has to go in for Quality and Excellence in a big way to survive and meet the global demand for Quality.

Hence, it is seen that there is a great demand for Quality Education on the global plane and we have to plan to meet this global challenge.

4. SOCIAL, PROFESSIONAL, AND MORAL DEMAND FOR QUALITY EDUCATION.

Besides Global demand for quality Education, there are other imperatives that compel us to go in for quality.

4.1 The Moral Imperative:

When we provide Educational Services to our clients and customers - Students, Parents and community - it is our moral duty to impart nothing less than the best Quality Education.

4.2 Professional Imperative:

Our Professional role as Educators. "Professional" implies a commitment to the needs of the students and obligation to meet their needs by employing the most appropriate pedagogic practices. As Educators, we have professional duty and obligation to improve the Quality of Education. As Teachers, Administrators and Policy makers we have to ensure that both the classroom practices as well as the Management of the Institutions, operate to the Highest Possible Standards.

4.3 Competitive Imperative:

Competition is a reality in the world of Education. In the new Educational market place, if we have to meet the competitive challenge, we must work hard to improve the quality of our Educational products, services and the delivery mechanism. Focusing on needs of the customers, which is at the heart of the Quality, is one of effective means for facing the competition and for survival.

4.4 The Accountability Imperative:

Our Engineering Colleges and Polytechnics and other Institutes of Higher Education are a part of the Community and the Society and

hence, they are accountable to the Society. And they must demonstrate high standards of our processes and products - Curriculum development and delivery, teaching and learning process, assessment and finally placement in the Industry.

Failure to meet even one of these imperatives, can create troubles for the Institutions and even for their survival. If they fail to provide quality services, they run the risk of loosing their customers who may opt out for their competitors. By regarding these driving forces as anything less than Imperatives, we risk the integrity of our profession and the future of our Institutions. We are in a situation where students, parents and politicians are asking tough and uncompromising questions. Therefore, continuous improvement is no longer an option but a necessity for Education.

5. WHAT IS QUALITY?

The Quality is not merely a global, national and regional demand, not merely a necessity but a matter of survival. Quality is at the top of most agendas and improving quality is the most important task facing any Institution. However, in spite of its importance, many people find it an enigmatic concept. It is perplexing to define and often difficult to measure. One person's idea of quality often conflicts with another and we never find these two experts ever come to the same conclusion. Still attempts have been made to define quality.

Some definitions are given below,

- a. Quality is confirming to requirements (Crosby, 1984).
- b. Quality is "Surpassing customer's needs and expectations (Deaming, 1987).
- c. Quality is "Fitness for use "(Jurn 1989).

5.1 What is Quality Education?

According to the Swami Vivekananda, "Education is the Manifestation of divinity in man"

According to M.S.Greenwood & J.H.Gaunt,

"Quality Education is the continuous improvement of the system to enable the optimum state of personal, social and intellectual development of an individual which will result in society and colleague loyalty, now and in future".

5.2 According to J.J.Sparks,

"Quality Education is specifying worthwhile goals and enabling students to achieve them."

The worthwhile goals are

- i) academic standards.
- ii) Expectations of the society.
- iii) Student's aspirations;

5.3 The definition given by Swami Vivekananda is too philosophical: However definitions given by Greenwood, Gaunt and J.J.Sparks are practical and worth considering in the context of Engineering Education. It is here that the skill, ability and competence of our members of the Boards of Studies, University Professors responsible for framing the syllabus and constantly updating it and Educational Administrators and Policy makers is put to test, in translating these guidelines into reality such that our Education becomes relevant, meaningful and gives no scope for complaints by the stakeholders the students, Parents, Industry and the Society.

Having framed such a quality curriculum and academic programs, the question of the delivery of quality Education assumes significance and calls for skilled Quality Management Practices. What is the situation today in respect of quality management practices, has to be studied in depth and corrective measures need to be considered for improvement, if necessary.

6. IF THIS IS QUALITY, WHAT IS EXCELLENCE

Quality, Standards & Excellence are inter-related terms. These terms indicate Quality at different levels. While dealing with Quality, we *always think* of Relative Quality and not Absolute Quality.. Excellence is a contextual term and needs to be specified in a particular context or situation .e.g. An Excellent Institution may be described as a world class institution (WCI).

7. PRESENT STATUS OF QUALITY IN ENGINEERING EDUCATION.

Today, we have about 1800 Engineering colleges, 1,80,000 Engineering Teachers, 1500 Polytechnics, 1,00,000 Polytechnics Teachers spread all over the country. We have AICTE which has been assigned the task of maintaining quality and standards in Engineering Education System. AICTE has established an accrediting agency—National Board of Accreditation – (NBA) in 1996 which assesses quality in technical institutions and grades them according to the degree of quality attained by them. It was, then, presumed that with the setting up of NBA, the quality of the institutions will be enhanced.

What has been the impact of the NBA on the quality and Standards? It is still to be ascertained. It is reported that only about 20% of the institutions have been accredited, so far. However, it may be mentioned that on account of NBA which is functioning for more than a decade, adequate awareness about quality has taken place if not quality.

If the Principals and the Management of the institutions have become aware of the need of Educational quality, then how are they going about for bringing in quality in the institutions?

Actually, it is necessary to undertake a survey as to what efforts are being made and what philosophy/ methodology is being adopted by the Principals and the Managements and with what results? We have no mechanism or

arrangement for training the Management and Principals, who should be mainly responsible for building up quality in the institutions. Some Principals are putting their efforts to build up quality in the institutions, by trial and error method based on their own perceptions of Quality and where neither any philosophy nor any Methodology is being adapted. As such, the picture of quality enhancement **which** is expected to take place, is not encouraging.

In this context, Education should look to industry where quality is in great demand and continuous efforts are being made for enhancing quality; because, for industry. Quality is a matter of survival. Industry, all over the world, has taken quality seriously and found that the philosophy of Total Quality Management or ingredients of this philosophy, has helped them tremendously in enhancing Quality.. Engineering Education is the main supplier of technical manpower to Industry and hence must keep in touch with the developments in industry and try to learn from them. If they do so, even in a small way, they will find that TQM will be the best launching pad for any quality efforts in Engineering Education.

8) WHAT IS TOTAL QUALITY MANAGEMENT i.e. TQM.?

The principals of TQM are neither new nor unique. What is new is the recognition that we can and must pursue quality continuously by systematic means if we are really serious about Quality. If we want to adopt TQM philosophy, we must know the Six foundation of the TQM philosophy which are described below.(Gregory Lozier, Deborah J.Teeter)

- i) Establishing a mission & focus on the customers : Understanding quality requires knowing what we do? Why we do? And the purpose of the organization. This also requires constancy of purpose which again requires patience and a long term commitment to well established and well understood mission statement that provides the organization with a frame work for

making decisions in a consistent manner. Commitment to the purpose, provides the motivation for long term change.

- ii) **Creating a Vision:** If mission gives the answer to what an organization does and for whom it does, Vision tells us where the organization is going, and what the organization will be like, when its mission and goals are achieved. Without a vision, an institution interested in the pursuit of quality is likely to spin its wheels without advancing or improvement.
- iii) **Improving the Processes Continually:** Processes i.e. - the flow of work activities -are the means by which we carry out the Mission. Generally, we pay attention to inputs, design and outputs and do not much bother about the means or processes through which we carry out the Missions. Perusing quality requires eliminating or reducing mistakes in all the processes.

There are three types of process mistakes: Rework, scrap and un-necessary complexity. These mistakes can be termed as process defects. Ultimately, process improvement comes not from detecting these defects but from preventing such mistakes.

- iv) **Using systematic analysis:** TQM has its roots in SQM – statistical quality control. SQM places considerable emphasis on the scientific method. which may be described by the PDCA cycle i.e. Plan- Do-Check- Act -Cycle. The systematic method also requires us to base changes on facts rather than on conjecture or intuition
- v) **Promoting Participation:** Team work and team decision making are important aspects of quality process improvement. These teams must understand the process and they must be committed to improvement. They must never be satisfied at any stage of improvement but should always believe that further improvement is

possible and keep on trying for the same. The “Total” in TQM indicates that total people, all categories of cadre in an organization, should be involved in the quality improvement processes and that quality must be inducted in each and every process.

- vi) **Systems Approach:** The entire organization should be considered as one System which implies that any change made at one place is likely to influence other parts of the system. Systems thinking needs to recognize the interrelationships among the people, process and sub-units of the organizations. This implies that the organization should be considered as a learning organization. which constantly expands its capacity to create the future by recognizing that the success of any individual depends on the success of others. To sum up, it may be said that these six foundations for the pursuit of quality under TQM philosophy, have a powerful impact on the efforts to improve quality, be it Engineering Education or higher Education or even industry.

9. DEFINITIONS OF TOTAL QUALITY MANAGEMENT.

The following are assertions or statements about TQM.. As you read these lines, please note both the assumptions they cover and the key ideas which they contain.

- TQM involves everything an Organization, a Society, or a Community does, which in the eyes of others determines its reputation on a comparative basis with the best alternative
- TQM - A total system of quality improvement with decision making based on facts - data collection - not on opinion or impressions.
- Total quality embraces not only the quality of the specific product or service which the end –user or the customer purchases or receives, but everything an organization does internally, to achieve continuing performance improvement.

- TQM assumes that quality is the outcome of all activities that take place within an organization, that all functions and all employees have to participate in the improvement process; that organization needs both quality systems and a quality culture.
- TQM is a way of managing an organization so that every job, every process, is carried out right, first time and every time.

Thus, TQM is a philosophy of continuous improvement, which can provide any educational institution with a set of practical tools for meeting and exceeding present and future customers' needs, wants and expectations. TQM is a philosophy and a methodology that assists institutions to manage change and set their own agendas for dealing the external pressures. Transforming the culture of a institution is a slow process but with ever greater pressure for a change and "improvement". TQM provides an essential framework for transition and also, the tools and techniques for managing change.

10. IMPLEMENTING TQM IN THE CONTEXT OF ENGINEERING EDUCATION.

Quality does not just happen. It must be planned for. Quality needs to be a major plank in an institution's strategy. It must be approached systematically using rigorous strategic planning process. Without a clear long term direction, institutions cannot plan for quality improvement. Constancy of purpose is a must along with customer focus, for TQM implementation.

10.1 Strategic Quality Management, Strategic planning enables the formation of long term priorities and helps institutions to manage the change in a rational manner. This directs Managers attention from day to day issues and forces a critical examination of the main purpose of the institution and its key relationship with its customers— particularly, the students, employers and the society.

10.2 Vision: The institution must develop its Vision. The Vision statement communicates the purpose of the institution, what it stands for. It should also indicate what the institution aspires to be when its mission is fulfilled..

10.3 Mission: statement provides a clear direction for the present and future. It makes clear how an institution is different from other institutions. It is important to ensure that the mission is translated into necessary actions so as to take advantage of the opportunities available to the institution..

10.4 Values: The Values of an organization are the principles through which it operates and seeks to achieve its Mission and Vision. They express the beliefs and aspirations. of the organization.. Values drive organizations and provide them with directions. They also provide consistency of purpose. The values must be aligned to the environment in which the institution operates.

10.5 Goals: The Vision, Mission and Values have to be translated into achievable Goals. Goals can be expressed as Aims and Objectives. These should be measurable so that the results can be evaluated against the set goals.

10.6 Market Research: It is an important means of listening to customers, both actual and potential. It is through this method that the "customers' perceived notion of quality" can be established.

10.7 SWOT Analysis: It is an important tool of strategic planning and effective means of locating the institutions potential. The SWOT Analysis aims to identify key areas under the headings; Strengths, Weakness, Opportunities and Threats. The aim of the SWOT analysis is to utilize Strengths, minimize Weaknesses, reduce the Threats and build on Opportunities.

The SWOT Analysis should be carried out, not only for the whole institution, but also for each department of an Engineering college or Polytechnic.

11. CRITICAL SUCCESS FACTORS: (CSFS):

These are indicators of what must be achieved if the institution is to satisfy its customers and fulfill its mission. They are important elements in the strategy process and provide a guide to the key quality characteristics of the institutions. The CFS could be internal or external to the institutions. For example:-

Internal CFS:

- a) Accessible Admission system
- b) Improved Examination Results.
- c) Improved Teaching Learning Strategies.

External CFS:

- a) Improved Access to the Institutions.
- b) Increased Market Share.
- c) Improved Relation with Industry and Commerce.

The CFSs highlight what has to be achieved if the Institution is to move to the Quality goal. Hence, their importance.

12. THE STRATEGIC PLAN

The strategic plan - some times called corporate plan or Institutions Development plan-details the measures which the institution intends to take to achieve its Mission. It sets a medium-term-time scale usually three years period. Its aim is to give the institution guidance and direction.

13. THE QUALITY PLAN:

It is a clear statement of policy on quality. The quality policy is statement of commitment by the management of the institutions. This statement should spell out the core quality activities that will bring in quality and excellence in both management of the institutions and

management of the activities within - the classroom, particularly, the teaching and learning process. These activities should be linked with budgeted estimate. Such a policy should be declared at the beginning of the academic year so that it may be clear to the teaching and non teaching staff and the students as to how they can participate in the implementation of the quality plan.

14. MONITORING AND EVALUATION

The quality plan has to be monitored in a transparent visible way. And the outcome and results should be evaluated and the feedback, thus obtained should be used for improvement of the planning process.

CONCLUSION

At present, it appears, no systematic method for quality enhancement is being used in the Engineering colleges and Polytechnics. What is used is, only trial and error method.— Study the Questionnaire of the NBA and try to see how the Institution can meet the NBA requirements,. This can be described as a Reactive Approach. . It is essential that this Trial and Error or the Reactive Approach be discarded and a Proactive Method be adopted. This could be to study the concepts of Quality, Quality Assurance, Continuous Quality Improvement, and the related terms. Then, a systematic method like Total Quality Management could be adopted by the Engineering Education if Quality and Excellence is to be brought in, in a visible and demonstrative way. For this, Training in the Philosophy and Methodology of TQM is a should and must, not merely for the Principals, the Faculty and the Managers of the institutions but also for the Administrators and the Policy-makers, both, at the State as well as the National Level. If India is to be Super power and Educational Hub on the International plane by 2020, we must adopt TQM philosophy as a National Policy, for launching our quality efforts.

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